

(19) World Intellectual Property Organization  
International Bureau



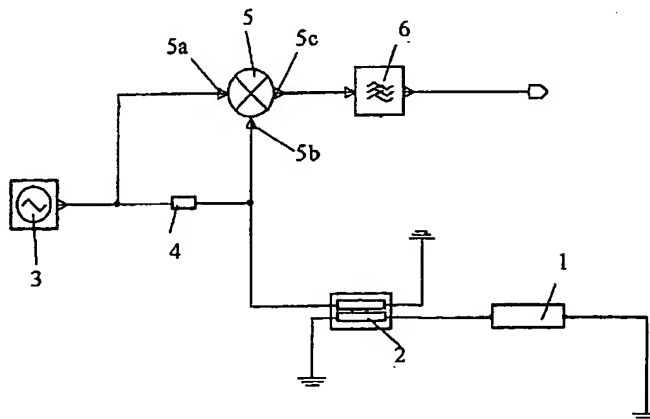
(43) International Publication Date  
30 October 2003 (30.10.2003)

PCT

(10) International Publication Number  
**WO 03/090353 A2**

- (51) International Patent Classification?: **H03H 9/02**
- (21) International Application Number: **PCT/GB03/01627**
- (22) International Filing Date: **15 April 2003 (15.04.2003)**
- (25) Filing Language: **English**
- (26) Publication Language: **English**
- (30) Priority Data:  
0208881.3      18 April 2002 (18.04.2002)      GB
- (71) Applicant (for all designated States except US):  
**TRANSENSE TECHNOLOGIES PLC** [GB/GB];  
66 Heyford Park, Upper Heyford, Bicester, Oxford OX25  
5HD (GB).
- (72) Inventors; and
- (75) Inventors/Applicants (for US only): **KALININ, Victor, Alexandrovich** [RU/GB]; 27 Derwent Avenue, Headington, Oxford OX3 OAR (GB). **BECKLEY, Peter, John** [GB/GB]; 29 Dodgson Road, Cowley, Oxford OX4 3QS (GB).
- (74) Agents: **HEDGES, Martin, Nicholas et al.**; A A Thornton & Co., 235 High Holborn, London WC1V 7LE (GB).
- (81) Designated States (national): AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NO, NZ, OM, PH, PL, PT, RO, RU, SC, SD, SE, SG, SK, SL, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, YU, ZA, ZM, ZW.
- (84) Designated States (regional): ARIPO patent (GH, GM, KE, LS, MW, MZ, SD, SL, SZ, TZ, UG, ZM, ZW), Eurasian patent (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European patent (AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HU, IE, IT, LU, MC, NL, PT, RO, SE, SI, SK, TR), OAPI patent (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG).
- Published:  
— without international search report and to be republished upon receipt of that report
- For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.

(54) Title: **IMPROVED METHOD AND APPARATUS FOR TRACKING A RESONANT FREQUENCY**



(57) Abstract: An arrangement for tracking the resonant frequency of one or more electrically resonant structures (11, 21) through a single channel comprises a variable frequency oscillator (13, 23) associated with the or each resonant structure (11, 21) which provides an excitation signal of a variable frequency encompassing the possible resonant frequency of the associated resonant structure. Coupling means (2) are provided which connect the or each variable frequency oscillator (13, 23) to said resonant structure(s). An I-mixer (15, 25) is provided for each oscillator (13, 23) which forms a synchronous detector, a first input (15a, 25a) of each I-mixer (15, 25) being connected to its associated oscillator (13, 23) and a second input (15b, 25b) being connected to the coupling device (2), the or each I-mixer (15, 25) mixing the excitation signal from the associated variable frequency oscillator (13, 23) with a response signal generated by the resonant structure(s) in response to the or each excitation signal. The output of the or each I-mixer (15, 25) is filtered to remove the sum products of the excitation and response signals, thereby leaving just an amplitude modulation component of the signal, which is then processed in a control loop to track the resonant frequency of the or each resonant structure.